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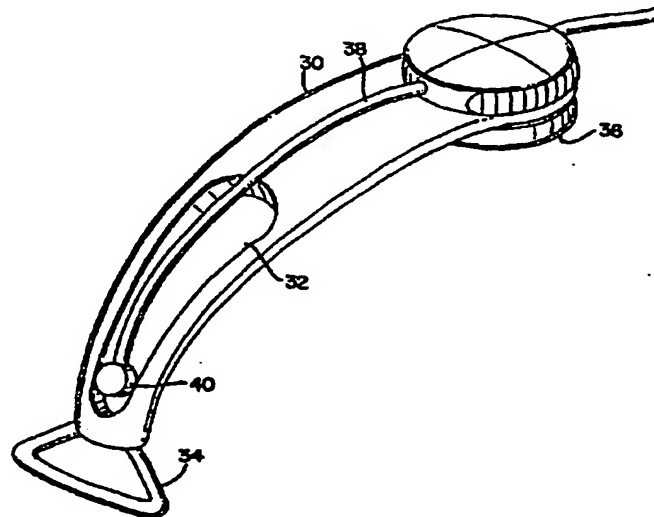
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : H04R 1/10, H04M 1/05	A1	(11) International Publication Number: <b>WO 98/06233</b> (43) International Publication Date: 12 February 1998 (12.02.98)
(21) International Application Number: PCT/US97/14047 (22) International Filing Date: 8 August 1997 (08.08.97)  (30) Priority Data: 60/023,720 8 August 1996 (08.08.96) US 08/908,306 7 August 1997 (07.08.97) US  (71)(72) Applicant and Inventor: MATSUDA, Hari [US/US]; 1308 Ashbury Avenue, Evanston, IL 60201 (US).  (74) Agents: MORNEAULT, Monique, A. et al.; Wallenstein & Wagner, Ltd., Suite 5300, 311 South Wacker Drive, Chicago, IL 60606 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  Published <i>With international search report.</i>	

(54) Title: INTERCHANGEABLE RECEIVER/MICROPHONE COMMUNICATION DEVICE



(57) Abstract

An interchangeable communication device for transmitting and receiving communication is disclosed. The device comprises an elongated body, the body having an opening therein, and having at one end an earpiece, an arm extending from the earpiece, including a microphone along its length, and an expandable and retractable headband cooperating with the other end of the body.

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INTERCHANGEABLE RECEIVER/MICROPHONE  
COMMUNICATION DEVICE

Priority is claimed from U.S. Provisional  
Application Serial No. 60/023,720, filed August 8, 1996.

DESCRIPTION

5    Technical Field

        The present invention relates to a one-piece  
communication device and, more particularly, to a one-piece  
combination receiver and microphone which is interchangeable  
between hand-held or hands-free operation as with a headset.

10

Background Prior Art

Lifestyles are growing continuously more busy. Computers have also become a necessity rather than a convenience. People often are required to do more than one task  
5 simultaneously to keep pace. Telephones are also more widely used than ever.

Conventional corded telephones are becoming a thing of the past. Cordless telephones permit more freedom for the user to do other tasks. Cordless phones, however, still  
10 require the user to hold the phone with one's hands. This makes performing tasks such as typing difficult while on the phone. Offices rarely have cordless phones.

Oftentimes, for speed and efficiency, persons using a communication device need their hands free, or require  
15 privacy, in order to enter data in a computer, take notes, or handle paperwork, at the same time they are talking with a party. Ideally, the invention could completely replace the handset on any type of telephone, with one example being a kitchen telephone where hands-free operation would be  
20 advantageous during meal preparation.

There is a need for a telephone handset device which frees the user's hands for performing tasks while using the phone. Operation of communication devices, such as  
25 conventional telephones, cellular telephones and combination microphones and receivers would offer greater advantage and convenience if they were easily convertible into hands-free headset units. The present invention solves this and other problems.

Summary of the Invention

The present invention is useful for those interested in maintaining primarily a hand-held unit, but also want the option of hands-free and private operation in the same device.

5 The present invention offers a communication device having the capability of being used comfortably as either a conventional hand-held device, or as a headset. The body of the device is large enough to be held comfortably in hand, but small enough to be worn comfortably as a headset for extended periods of

10 time. A primary advantage of the invention is that it allows for quick and easy conversion between hand-held operation and a headset, with virtually no interruption in the conversation. Specifically, a short telephone call could be answered with the device as a handset, yet if the conversation continues,

15 the device can be easily converted into a comfortable headset. The invention also overcomes the problems associated with traditional headset units, which many users find inconvenient and awkward to answer when used in a manner that they are not intended to be used, i.e., as a telephone answering device.

20 As a result, many users stop using the headsets as telephone answering devices. The present invention provides an advantage in that it can be used as both a traditional headset and as a traditional telephone answering device. This and other advantages, solve the problems associated with the prior

25 art devices.

An object of the invention is to provide an interchangeable handset/headset communication device. In accordance with one embodiment of the invention, the

communication device comprises an elongated body. Forming one end of the body is an earpiece receiver tapering to an arm. The end of the arm opposed to the earpiece, ends in a microphone. The body has an opening for cooperation with the microphone when the device is used as a handset.

For conversion into a headset, and with the pivot point being the earpiece, the body is rotated approximately 180 degrees about the earpiece relative to the arm of the device, swinging the body upward and away from the microphone arm of the device. At the end of the body opposite the earpiece, the invention further includes a headband, which is expandable and adjustable to fit the head of the user, allowing hands-free use of the communication device. With the headband in an extended position, and the body rotated outwardly away from the microphone arm of the device, the device is ready for hands-free headset operation. When not in use, the headband is stored in a retracted position within a slot formed within the body.

Other features and advantages of the invention will be apparent from the following specification taken in conjunction with the following figures.

#### Brief Description of Drawings

Figure 1 is a plan view of a communication device as a hand-held device made in accordance with the invention;

Figure 2 is a plan view of the communication device of Figure 1 showing the device as a hands-free device.

Figure 3 is a plan view of a second embodiment of the communication device as a hands-free device.

Figure 3a is a plan view of the communication device showing the headband assembly in a partially open position.

5        Figure 3b is a plan view of the communication device showing the headband assembly and headband in a fully extended position.

Figure 4 is a plan view of a third embodiment of the communication device made in accordance with the invention.

10       Figure 5 is a plan view of the third embodiment showing the device in a partially open position.

Figure 6 is a plan view of a fourth embodiment of the communication device made in accordance with the invention.

15       Detailed Description

While this invention is susceptible of embodiments in many different forms, there is shown in the drawings and will herein be described in detail, preferred embodiments of the invention with the understanding that the present disclosure  
20       is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspects of the invention to the embodiments illustrated.

An interchangeable microphone/receiver communication device, generally designated 10, is shown in Figure 1. The  
25       device 10 is typically utilized and constructed to receive and transmit communications over conventional internal and external telephone lines and cellular telephones. The device 10, for example, can be easily connected to a standard

telephone jack. Alternatively, the device can be a complete replacement for a conventional telephone handset. As will be described, the device 10 can be operated as either a hand-held or a headset unit.

5           The communication device 10 can be any shape, but the body 12 of the device is preferably substantially oblong in both plan and elevation. The body 12 is also relatively thin and lightweight, so as to be comfortable when used as a headset. The body 12 is also slightly contoured in a  
10           lengthwise direction, for style and convenience when used as a headset. Finally, the body 12 is constructed preferably by injection molding using any lightweight, durable plastic, as is known in the art.

          As shown in Figures 1 and 2, one end of the body 12 is  
15           formed by an earpiece 14. The earpiece 14 can be any shape, but is preferably a shape to fit the ear, such as round or oval. In an effort to provide further comfort to the user of the communication device 10, the earpiece 14 is preferably constructed from a lightweight, spongy material, such as a  
20           foam or soft rubber. The earpiece 14 serves as a pivot point, cooperating with an arm 16 having an opposed end 16a comprising a microphone 18, to form the hands-free device.

          Connected to and extending away from the earpiece 14, and preferably forming one, continuous line with the earpiece, is  
25           the arm 16. The end 16a of the arm 16 includes the microphone 18. Optionally, the arm 16 can also be a hollow tube wherein the microphone 18 is centered along the length of the tube and closer to the ear of the user, rather than at the end 16a of



the arm. In this embodiment, sound is transmitted through the hollow tube to the microphone 18.

The arm 16 is slightly curved from the earpiece 14 to the microphone 18, so that when the device is used in a hands-free position, the microphone, whether located at the end of the arm or nearer to the earpiece, is properly positioned for speaking into while listening in the earpiece. The arm 16 is also slightly curved to conform to the slight curve of the body 12 of the device 10, such that when the device is in a hand-held configuration, the arm rests flush within a groove 17 along the top of the device. In this flush position, the arm 16 is stored within the body 12, maintaining the smooth, one-piece outer appearance of the device 10. The flush positioning of the arm 16 also maintains the comfort level of the device 10 because the arm does not interfere with the person's grip when the device is held by hand.

As shown in Figure 2, the end 16a of the arm 16 opposed from the earpiece 14 includes a microphone 18. The microphone 18 is a small cylinder about 0.5" in diameter and 0.375" in thickness. Preferably, the microphone 18 is obviously much smaller than a typical mouthpiece found on the handset of a standard, hand-held telephone. As previously noted, the microphone 18 can also be positioned within the arm and nearer to the ear of the user.

When the device 10 is in a hand-held configuration, and the arm 16 is positioned within the groove 17, the microphone 18 is accessible for speaking through an opening 19 in the groove. The opening 19 is large enough so as not to interfere

with communication into the microphone 18, but is not so large as to distract from the appearance of the device 10.

One advantage of the present invention is that it is easily convertible between a hand-held and a hands-free headset communication device. To convert the device 10 from a hand-held position to a headset position, the arm 16 is lifted slightly upward to remove it from the groove 17 of the device. The arm 16 is then held stationary while the body 12 is swung away from the arm 16 with the earpiece 14 being the pivot point. The microphone 18 and is now in a position approximately 180° from its original resting position in the groove 17 of the device 10 when the device was in a hand-held configuration.

To complete the conversion of the device 10 into a hands-free headset, a headband 20 is used to secure the device onto the head of the person using the device. The headband 20 is preferably constructed from a lightweight, flexible material such as spring steel or a shape-retaining plastic. The headband 20 is also slightly curved to fit across the top of the person's head using the device 10. A head pad 23 is located at the end of the headband 20. The head pad 23 is preferably constructed from a lightweight, spongy material, such as a foam or soft rubber for both comfort and securing the headband 20 on the head of the user.

When not in use, the headband 20 is retractable into a slot 22 positioned within the body 12 of the device 10. The headband 20 can be pulled out from the slot 22 by grasping the head pad 23, which is not stored within the slot. Preferably,

the headband 20 is constructed to be slidably adjustable, both for ease in storing within the slot 22 of the device 10, and for adjusting to fit comfortably the head of the person wearing the device 10. Optionally, the headband 20 can be  
5 spring-loaded.

Figure 3 illustrates a second embodiment of the communication device 10'. In the second embodiment, the headband 20' is stored within a headband assembly 24. One feature of the second embodiment is that rather than having  
10 the microphone 18' located at the end of a rotatable arm 16', the microphone is formed as one piece with the body 12' of the device 10'. The microphone 18' is positioned opposed from the earpiece 14' similar to a conventional handset on a conventional hand-held telephone.

Another feature of the second embodiment, is that the  
15 headband 20' is stored within a separate headband assembly 24. The headband assembly 24 has a configuration similar to that of the body 12' of the communication device. The configuration of the headband assembly 24 allows it to be  
20 positioned flush alongside the body 12' of the communication device 10' when the communication device is being used in a hand-held configuration.

To convert the device 10' into a headset unit, the headband assembly can simply be pulled away from and rotated  
25 about the earpiece 14'. Optionally, a button 26 on the inside of the body 12' is pressed (Figure 3a). Pressing the button 26 releases the headband assembly 24 from the body 12' of the device, such that the headband assembly can be rotated 180°

about the earpiece 14' (Figure 3b). After rotation of the headband assembly 24 into an extended position, the spring loaded headband 20' can be pulled out of the headband assembly, and the device 10' can be positioned on the head of the user using the head pad 23', for headset operation.

Figure 4 shows a third embodiment of the present invention. In this embodiment, the body 30 has an enlarged opening 32. A headband 34 extends from one end of the body 32. The headband 34 consists of wires adapted to fit inside the body 32 until extended. At the other end of the body 30 is an earpiece 36. On the back of the earpiece 36 is a serrated knob 37. An arm 38 extends from the earpiece, and has a microphone 40 at its distal end. The microphone 40 cooperates with the opening 32 to permit sound to reach the microphone 40 when used as a handset.

Figure 5 shows the invention in the partially open position. To convert the unit to a headset the arm 38 is held stationary. The body 30 is grasped and rotated about the earpiece 36 until it is in the fully open position with the arm 38 in line with the length of the body 30. The headband 34 is then pulled from the body 30 and extended to fit around the user's head.

Figure 6 shows a fourth embodiment of the present invention. The body 42 comprises a pair of tubes 44 attached to a housing 45 containing the ear piece 47. The headband 46 comprises a pair of wires 48 which fit and are slidable within the tubes 44. Forms 49 made of plastic can be fitted to the tubes 44 to make the body 42 fit the hand. A microphone 50 is

attached to and rotatable about the ear piece 47. When hand held, the microphone 50 is situated between the tubes 44 to permit sound to reach the microphone 50. The body 42 rotates to convert to a headset as described above.

5           It will be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not to  
10 be limited to the details given herein.

## CLAIMS

I claim:

1. An interchangeable receiver/ microphone communication device comprising:

5 an elongated body, the body having an opening therein, and having at one end an earpiece;

an arm extending from the earpiece, including a microphone along its length; and

10 an expandable and retractable headband cooperating with the other end of the body.

2. The device of claim 1 wherein the microphone cooperates with the opening in the body to permit sound to directly reach the microphone.

15

3. The device of claim 1 wherein the body is rotatable about the earpiece.

4. The device of claim 1 further comprising a serrated knob attached to the earpiece.

20

5. The device of claim 1 wherein the headband is made of wire adapted to be inserted into the body such that it does not block the opening in the body.

25

6. The device of claim 1 wherein the body comprises a pair of tubes extending from a housing containing the ear piece, the tubes adapted to slidably receive the headband.

7. An interchangeable receiver/ microphone communication device comprising:

an elongated body, having at one end an earpiece tapering to an arm, the arm being a hollow tube having a microphone along its length, the body also having a groove adapted to secure the arm, and an opening in the groove adapted to cooperate with the microphone, the body further rotatable about the earpiece; and

an expandable/retractable headband cooperating with the other end of the body

8. An interchangeable receiver/ microphone communication device comprising:

a first elongated body, the first body having a microphone at one end and an earpiece at the other end;

a second elongated body rotatably connected to the earpiece of the first body at one end, the second body having an expandable/retractable headband cooperating with the other end.

FIG. 1

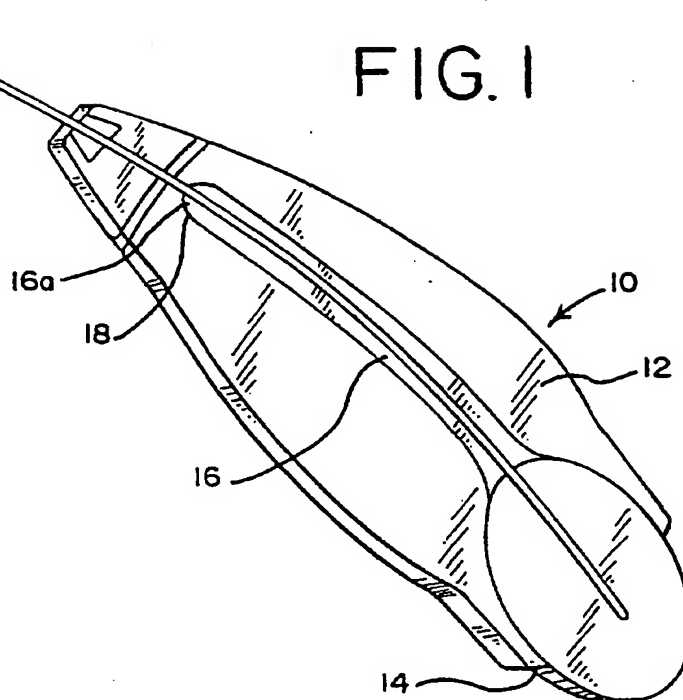
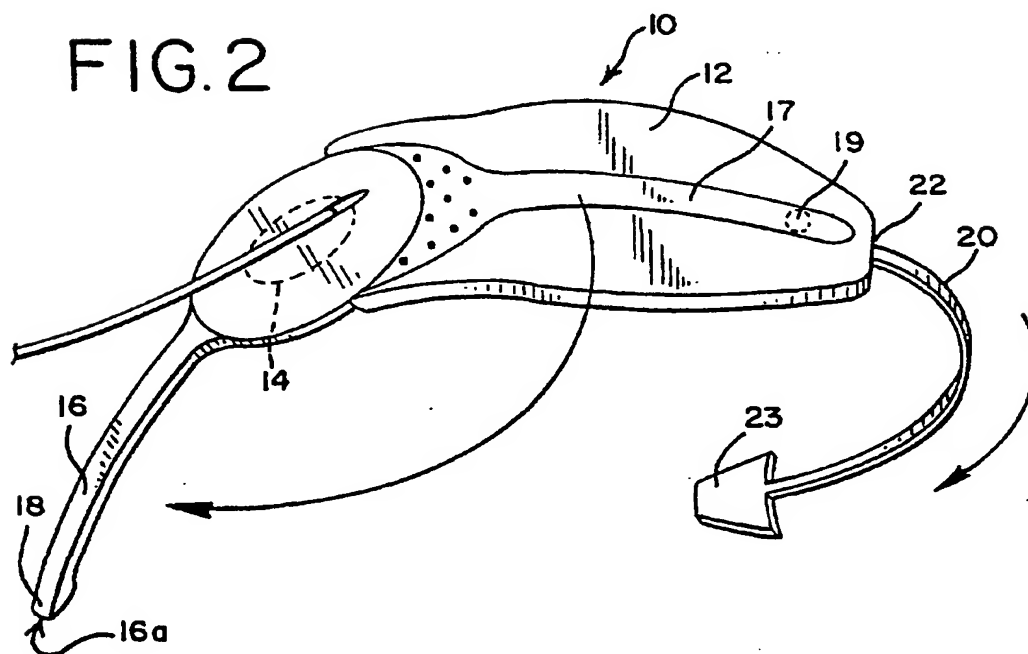
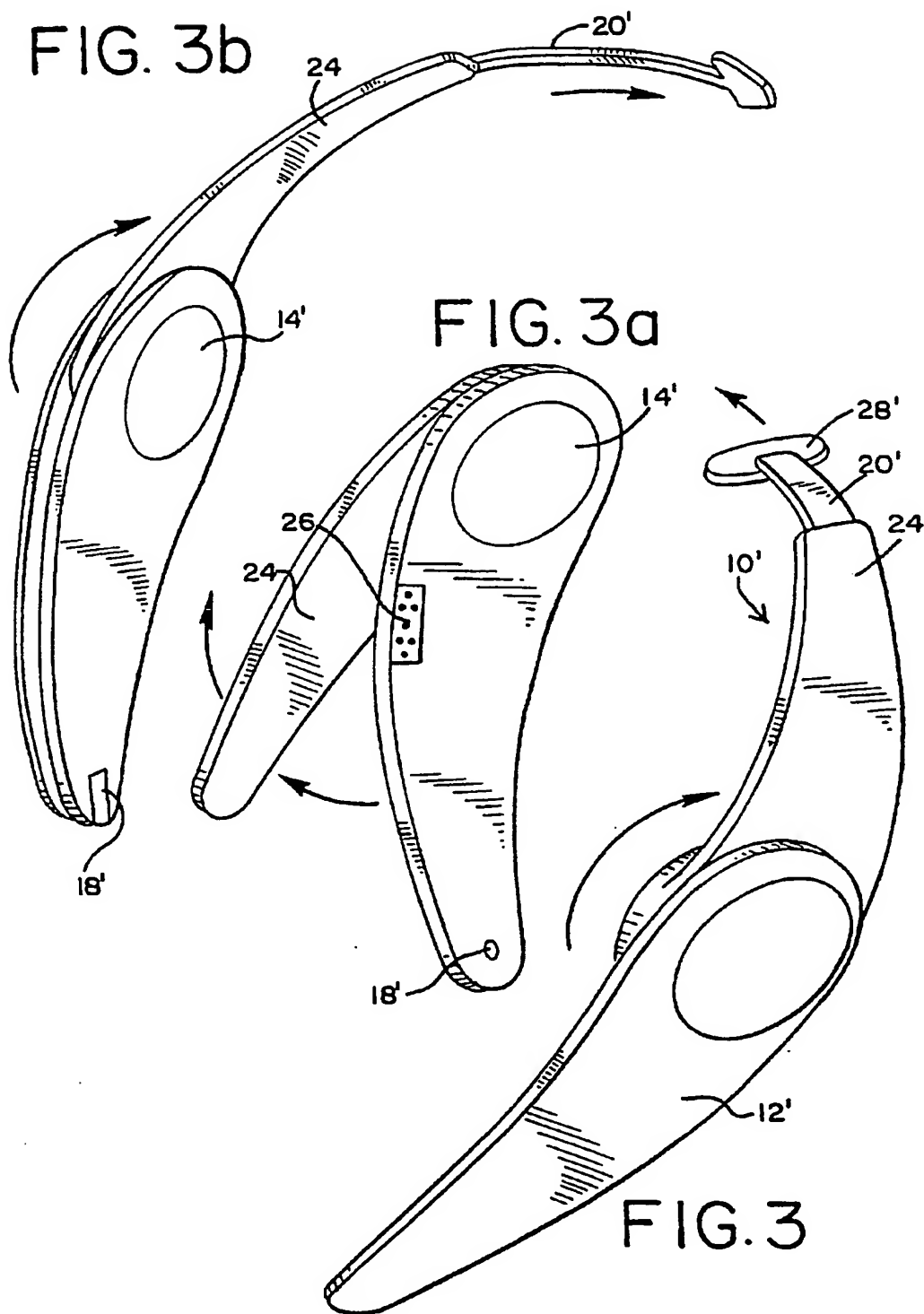


FIG. 2

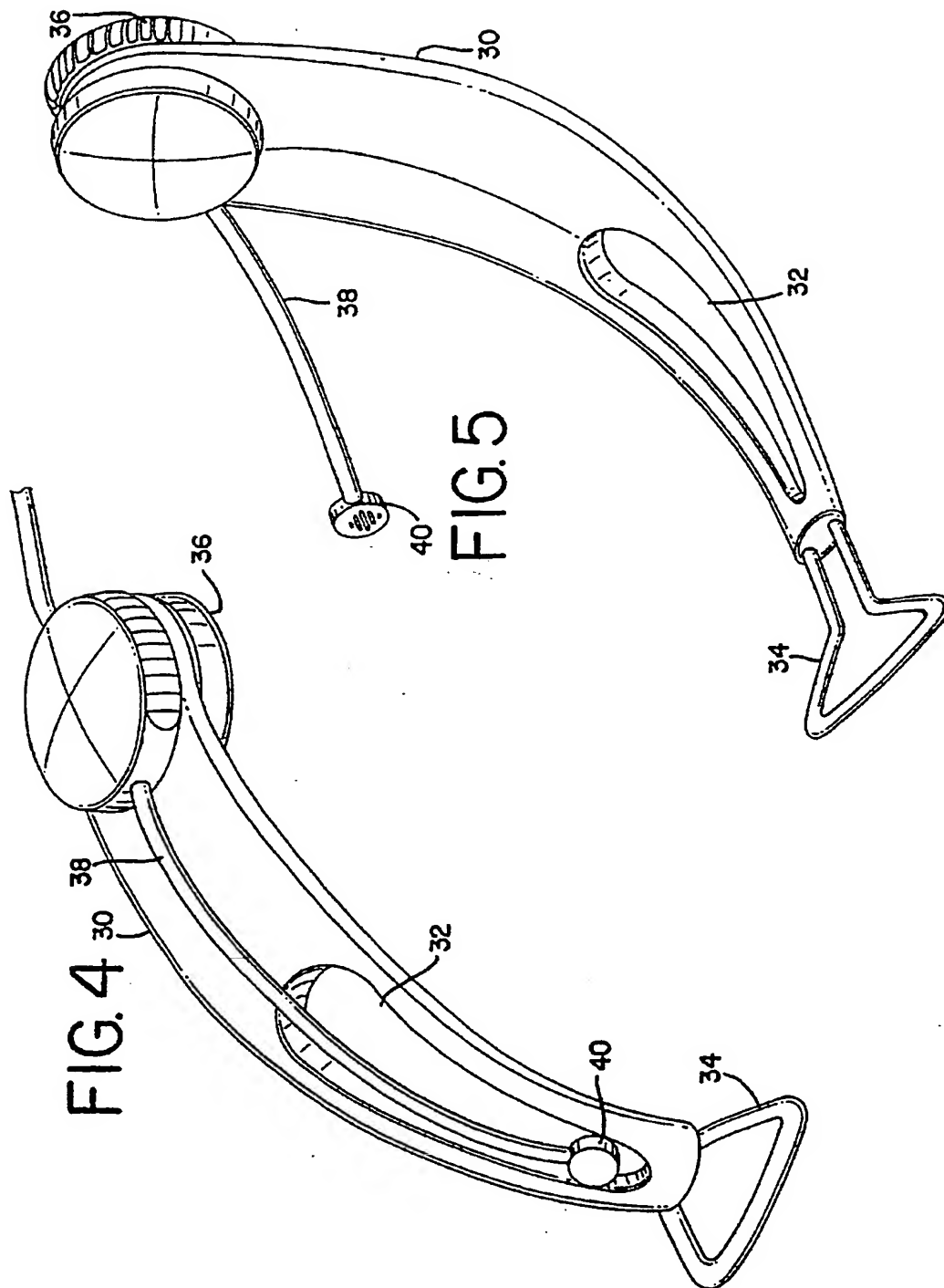


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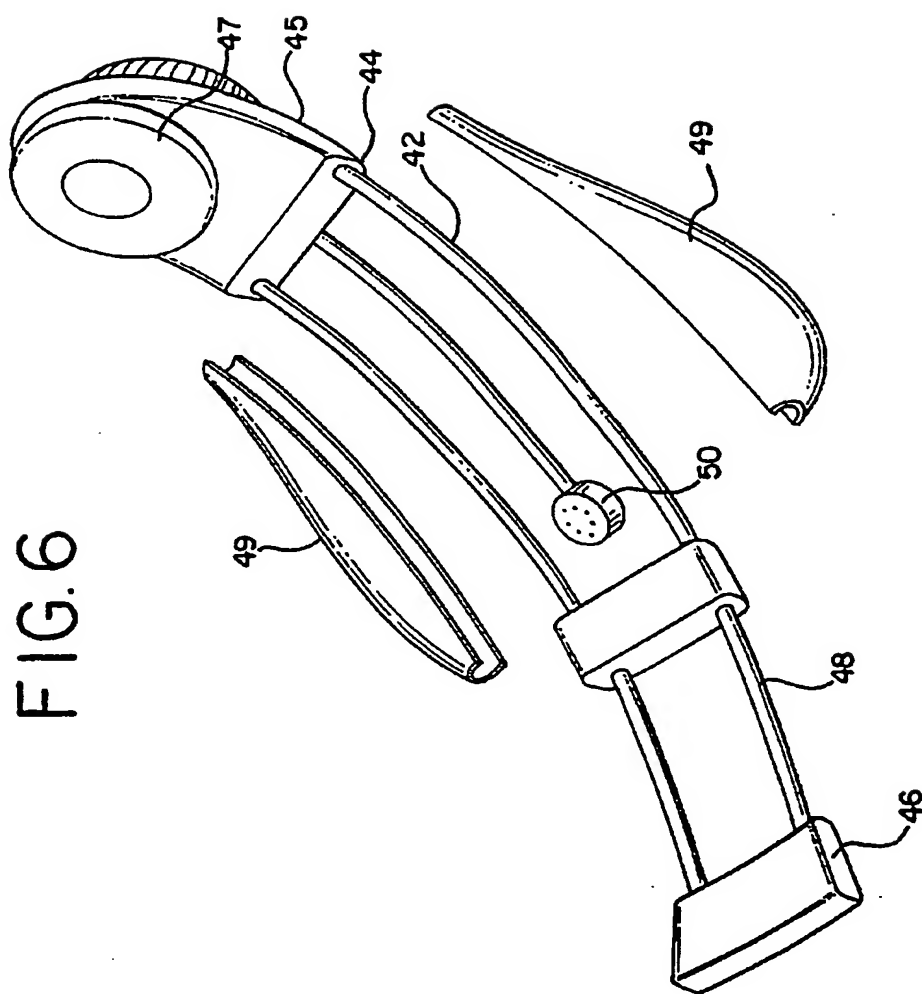


FIG. 6

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 97/14047

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6 H04R1/10 H04M1/05		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 6 H04R H04M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 754 484 A (LARKIN ET AL.) 28 June 1988 see column 1, line 51 - column 2, line 23 see column 4, line 19-55 -----	1-8
X	EP 0 262 915 A (A.T.WILLIAMSON) 6 April 1988 see column 2, line 5 - column 3, line 33 -----	1-8
X	GB 1 296 160 A (S.G.BROWN LIMITED) 15 November 1972 see page 2, line 32-83 -----	1-8
A	EP 0 343 875 A (PING-HUANG CHEN) 29 November 1989 see column 1, line 46-54 see column 2, line 41 - column 4, line 16 -----	1-8
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Name and mailing address of the ISA European Patent Office, P.O. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 apo nl, Fax (+31-70) 340-3018		Authorized officer  <div style="text-align: center; font-weight: bold;">Zanti, P</div>

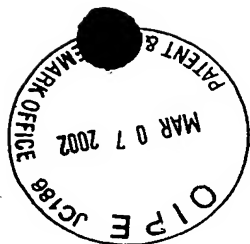
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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